



RWE



**RWE Renewables UK Dogger Bank
South (West) Limited**

**RWE Renewables UK Dogger Bank
South (East) Limited**

**Dogger Bank South
Offshore Wind Farms**

**Preliminary Environmental Information Report
Non-Technical Summary**

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Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore array areas, where the wind turbines and array cables will be located. The array areas do not include the offshore export cable corridor.
Baseline	The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Projects.
Construction Compound	Area set aside to facilitate construction. To be located adjacent to the onshore export cable corridor and along the landfall and onshore substations, with access to the highway (locations not yet determined).
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project.
Dogger Bank South (DBS) offshore wind farms	The collective name for the two Projects, DBS East, and DBS West.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed development over and above the existing circumstances (or 'baseline').
Evidence Plan Process (EPP)	A public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process.
Horizontal Directional Drilling (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.

Term	Definition
Landfall	The point on the coastline at which the offshore export cables are brought onshore, connecting to the onshore export cables at the Transition Joint Bay.
Offshore Development Area	The Offshore Development Area encompasses the wind farm site and the options for the offshore transmission works.
Offshore Export Cables	The cables which would bring electricity from the offshore substation platform(s) to the landfall.
Onshore Development Area	The Onshore Development Area for PEIR is the boundary within which all onshore infrastructure required for the Projects will be located including landfall, onshore export cable route, accesses, construction compounds and onshore substations. The Onshore Development Area is to be refined through the consultation and engineering review process.
Onshore Export Cables	Onshore export cables take the electricity from the Transition Joint Bay to the onshore substations.
Onshore Substation Zone	Parcels of land within the Onshore Development Area where the onshore substation infrastructure (including the haul roads, temporary construction compounds and associated cable routing) may be located.
Onshore Substations	A compound containing electrical equipment required to transform and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network. There will be one onshore substation for each Project.
Scoping Opinion	The report adopted by the Planning Inspectorate on behalf of the Secretary of State.

Glossary

Term	Definition
Scoping Report	The report that was produced in order to request a Scoping Opinion from the Secretary of State.
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms).

Acronyms

Term	Definition
DCO	Development Consent Order
Defra	Department of Environment, Food and Rural Affairs
DBS	Dogger Bank South
BEIS	Department for Business, Energy and Industrial Strategy
EIA	Environmental Impact Assessment
ES	Environmental Statement
GW	Gigawatts
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
MW	Megawatts
NPS	National Policy Statement
PEIR	Preliminary Environmental Information Report
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom

1. Introduction

1.1. About this Document

1. This document is the Non-Technical Summary of the Preliminary Environmental Information Report (PEIR) for the Dogger Bank South (DBS) East and DBS West offshore wind farms (herein 'the Projects').
2. The purpose of the PEIR is to provide Preliminary Environmental Information (PEI) to present the initial environmental assessment of the Projects, prior to submission of the Environmental Statement (ES). The ES will detail the finalised environmental assessment for the Projects and will be informed by responses to the consultation on the PEIR. The ES will accompany the application for a Development Consent Order (DCO) authorising both Projects and will be submitted to the Planning Inspectorate in early 2024.
3. The Projects are both Nationally Significant Infrastructure Projects. Consent to construct, operate and decommission The Projects will be requested from the Secretary of State for Energy Security and Net Zero, under the Planning Act 2008. An EIA is required to support a DCO application by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
4. This Non-Technical Summary is a stand-alone document intended to provide a high-level overview of the potential environmental impacts of the Projects in non-technical terms. For further information, the full PEIR should be referred to (www.doggerbanksouth.co.uk).

1.2. The Applicant and the Projects Team

5. The Applicant for the Projects are RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited (herein 'RWE'). RWE is one of the world's leading renewable energy companies and is a key player in the offshore wind market. RWE has been involved in offshore wind energy in the UK since the very start, having installed the first full scale offshore turbines in Blyth in 2000 and commissioned the UK's first commercial wind farm in 2003, the 60 megawatt (MW) North Hoyle Offshore Wind Farm.
6. RWE has committed to invest around £15 billion into green technologies and infrastructure in the UK by 2030 as part of its Growing Green strategy to grow its renewable portfolio and to become carbon neutral by 2040. As a driver of the energy transition, the company also focuses on innovative projects such as floating offshore wind as well as the generation and use of hydrogen.

7. RWE is the UK's largest power producer and one of the country's largest renewables generators, accounting for around 15% of all electricity generated. With a diverse operational portfolio of onshore wind, offshore wind, hydro, biomass and gas amounting to over 10 gigawatts (GW) pro rata (12 GW installed capacity), the company generates enough power for over 10 million homes.
8. In total, RWE operates 33 onshore wind farms, 10 offshore wind farms, 21 hydro plants and one biomass plant. For further information visit: www.rwe.com/rwe-renewables-uk.
9. Royal HaskoningDHV has been commissioned by RWE as the consultant to lead the EIA for the Projects, with support through the EIA process from additional consultants who are responsible for certain specialist topics.

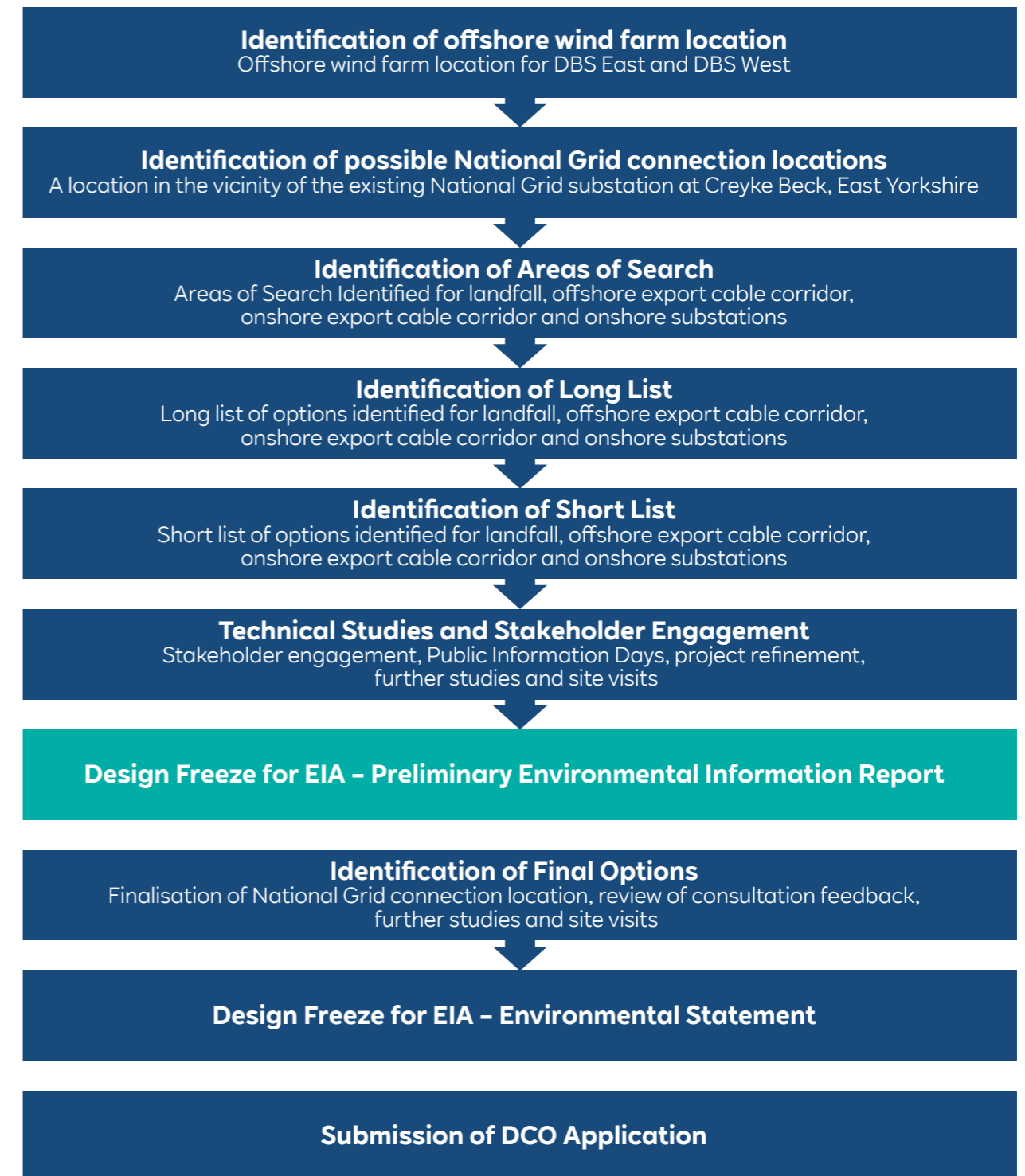
1.3. Purpose of the Projects

11. Climate change as a result of greenhouse gas emissions is a global issue associated with impacts on weather, ecosystems, human health and welfare. The UK has made an ambitious commitment to bring all greenhouse gas emissions to net-zero by 2050 (Department for Business, Energy and Industrial Strategy (BEIS), 2021). According to recent advice from the Committee on Climate Change (CCC, 2019), the UK may need at least 75GW of operating offshore wind farms to reach the legally binding net-zero greenhouse gas emissions target by 2050.
11. As part of the UK government's British Energy Security Strategy published in 2022, the target for offshore wind capacity is now up to 50GW by 2030 (BEIS, 2022).
12. The Projects will make a substantial contribution to both Government targets, for net-zero and security of supply targets." . Further detail is provided in **PEIR Chapter 2 Need for the Project** and **PEIR Chapter 3 Policy and Legislative Context**.

1.4. Site Selection and Assessment of Alternatives

- 13. The siting, design, and refinement of the Projects offshore and onshore infrastructure has followed a site selection process, taking account of environmental, physical, technical, commercial, and social considerations and opportunities. The details of the approach taken to select the array areas (where the wind turbines are located), offshore export cable corridor, landfall search area, onshore export cable corridor and the location of the onshore substations are provided in **PEIR Chapter 4 Site Selection and Assessment of Alternatives**. The aim was to identify locations that would be environmentally acceptable, deliverable, and capable of achieving consent, whilst also being economic and efficient.
- 14. The site selection process commenced with the identification of the offshore wind farm locations as part of The Crown Estate’s Offshore Wind Leasing Round 4 process. Then National Grid Electricity Systems Operator advised that the onshore grid connections for the Projects would be at a newly proposed National Grid substation in the vicinity of the existing National Grid substation near Creyke Beck, East Riding of Yorkshire. This enabled a selection process to be undertaken to identify possible locations for landfall, offshore export cables, onshore export cables, onshore substations, and onward connection to the national grid network.
- 15. **Plate 1-1** provides an overview of the site selection process undertaken for the Projects.

Plate 1-1 Overview of the DBS Site Selection Process



1.5. The Environmental Impact Assessment Process

16. The EIA considers all relevant topics under three general areas of physical environment, biological environment and human environment. The topics to be included in the EIA were agreed with the Planning Inspectorate and other stakeholders through the scoping process, with the Planning Inspectorate providing a Scoping Opinion in September 2022, which is available at: <https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/dogger-bank-south-offshore-wind-farms/>
17. The findings to date of the EIA for the Projects have been described in the PEIR. As part of the process, a combination of desk studies, surveys and stakeholder consultation have informed our characterisation of the existing environment within which the Projects are proposed to be located.
18. All potential effects of the construction, operation and decommissioning phases of the Projects have been identified as required by the Scoping Opinion, and an assessment made on the significance of likely effects by EIA specialists.
19. Identified receptors for potential impact are assessed by the level of sensitivity to, and the magnitude of, each impact. This provides a significance of effect for each effect, of either negligible, minor, moderate or major. Effects can be assessed as either adverse or beneficial. For the purposes of EIA, an effect is deemed significant if the effect is **moderate** or **major**. An effect is deemed not significant if the residual effect is assessed as **negligible** or **minor**.
20. Where the impact assessment identifies that an aspect of the wind farms is likely to give rise to significant environmental effect, mitigation measures are proposed to avoid impacts or reduce them to acceptable levels. Mitigation will be agreed through ongoing consultation with the relevant authorities and stakeholders, where applicable. Following the application of mitigation the effects are reassessed to give a final residual effect.

21. The EIA process also considers:
 - Inter-relationships, where impacts to one receptor can have a knock-on impact on another (for example an impact on a fish population may lead to reduced prey for birds and marine mammals);
 - Cumulative impacts, where the Projects will be considered alongside the predicted impacts of other projects in the nearby area (for example another offshore wind farm or a road development); and
 - Transboundary impacts, where activities in other countries may be impacted (for example shipping routes and fishing activities). The relevant countries have been identified as Belgium, Denmark, France, Germany, Netherlands, Norway, and Sweden.
22. For the purposes of the PEIR, a preliminary cumulative effects assessment has been undertaken for each topic which identifies a number of projects and plans which are likely to result in a cumulative effect and consider the impacts in relation to which cumulative effects might arise. The details of the approach taken is described within the cumulative effects assessment section of each chapter.

1.6. The Role of National Policy Statements in the Decision-Making Process

23. There are three National Policy Statements (NPSs) which are relevant to the Projects:
- EN-1 Overarching Energy, which highlights that there should be a presumption in favour of granting consent to applications for energy Nationally Significant Infrastructure Projects and recognises that offshore wind is a key factor in meeting UK policy objectives;
 - EN-3 Renewable Energy Infrastructure, which covers nationally significant renewable energy infrastructure, including offshore wind farms in excess of 100MW in English Waters); and
 - EN-5 Electricity Networks, which covers the electrical infrastructure (cables and substations) in conjunction with EN-1.
24. It is noted that NPS EN-1, EN-3 and EN-5 are in the process of being revised. Draft versions of each NPS were published for consultation in September 2021 (BEIS, 2021). A review of the 2021 draft versions has been undertaken in the context of this non-technical summary and topic specific chapters. In April 2023, second versions of the drafts were published for consultation, these will be reviewed and any relevant updates included in the ES.
25. The PEIR outlines how the development of the Projects would comply with the requirements stipulated by the NPSs given above.

1.6.1. Other Planning Policies

26. Local authorities are required to prepare and maintain up-to-date Local Development Plans which set out their objectives for the use and development of land within their jurisdiction, and general policies for implementation.
27. Onshore, the project's areas fall under the jurisdiction of East Riding of Yorkshire Council. Therefore, their development plans have been considered during the onshore site selection for the Projects to avoid, wherever possible, conflict with site-specific planning allocations. Where relevant for certain topics, such as the air quality and traffic assessments. The Hull City Council Development Plan has also been considered.
28. For the offshore components of the project the relevant Marine Plans have been considered, including the East Inshore and the East Offshore Marine Plans, and the North-East Inshore and Offshore Marine Plans.

1.7. Structure of the Preliminary Environmental Impact Report

29. The PEIR considers all the onshore and offshore elements of the Projects. The PEIR comprises three volumes:

- Volume 1: PEIR chapters (chapter list shown in **Table 1-1**);
- Volume 2: Figures; and
- Volume 3: Appendices.

Table 1-1 PEIR Volume 1 Chapter List

Section	Chapter	Title
Introductory	Chapter 1	Introduction
	Chapter 2	Need for the Project
	Chapter 3	Policy and Legislative Context
	Chapter 4	Site Selection and Assessment of Alternatives
	Chapter 5	Project Description
	Chapter 6	EIA Methodology
	Chapter 7	Consultation
Offshore	Chapter 8	Marine Physical Environment
	Chapter 9	Benthic Habitats
	Chapter 10	Fish and Shellfish Ecology
	Chapter 11	Marine Mammals
	Chapter 12	Offshore Ornithology

Section	Chapter	Title
Offshore	Chapter 13	Commercial Fisheries
	Chapter 14	Shipping and Navigation
	Chapter 15	Aviation and Radar
	Chapter 16	Other Marine Users
	Chapter 17	Offshore Archaeology and Cultural Heritage
Onshore	Chapter 18	Terrestrial Ecology and Ornithology
	Chapter 19	Geology and Land Quality
	Chapter 20	Flood Risk and Hydrology
	Chapter 21	Land Use
	Chapter 22	Onshore Archaeology and Cultural Heritage
	Chapter 23	Landscape and Visual Impact Assessment
	Chapter 24	Traffic and Transport
	Chapter 25	Noise
	Chapter 26	Air Quality
Wider Scheme Aspects	Chapter 27	Human Health
	Chapter 28	Socio-Economics
	Chapter 29	Tourism and Recreation
	Chapter 30	Climate Change

1.8. Consultation

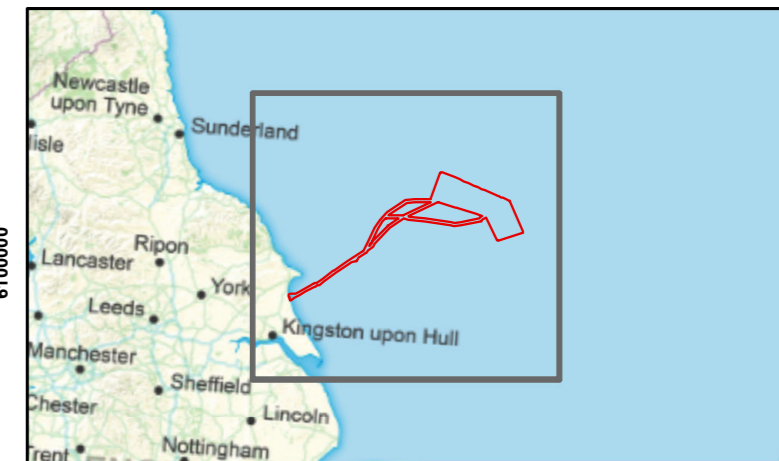
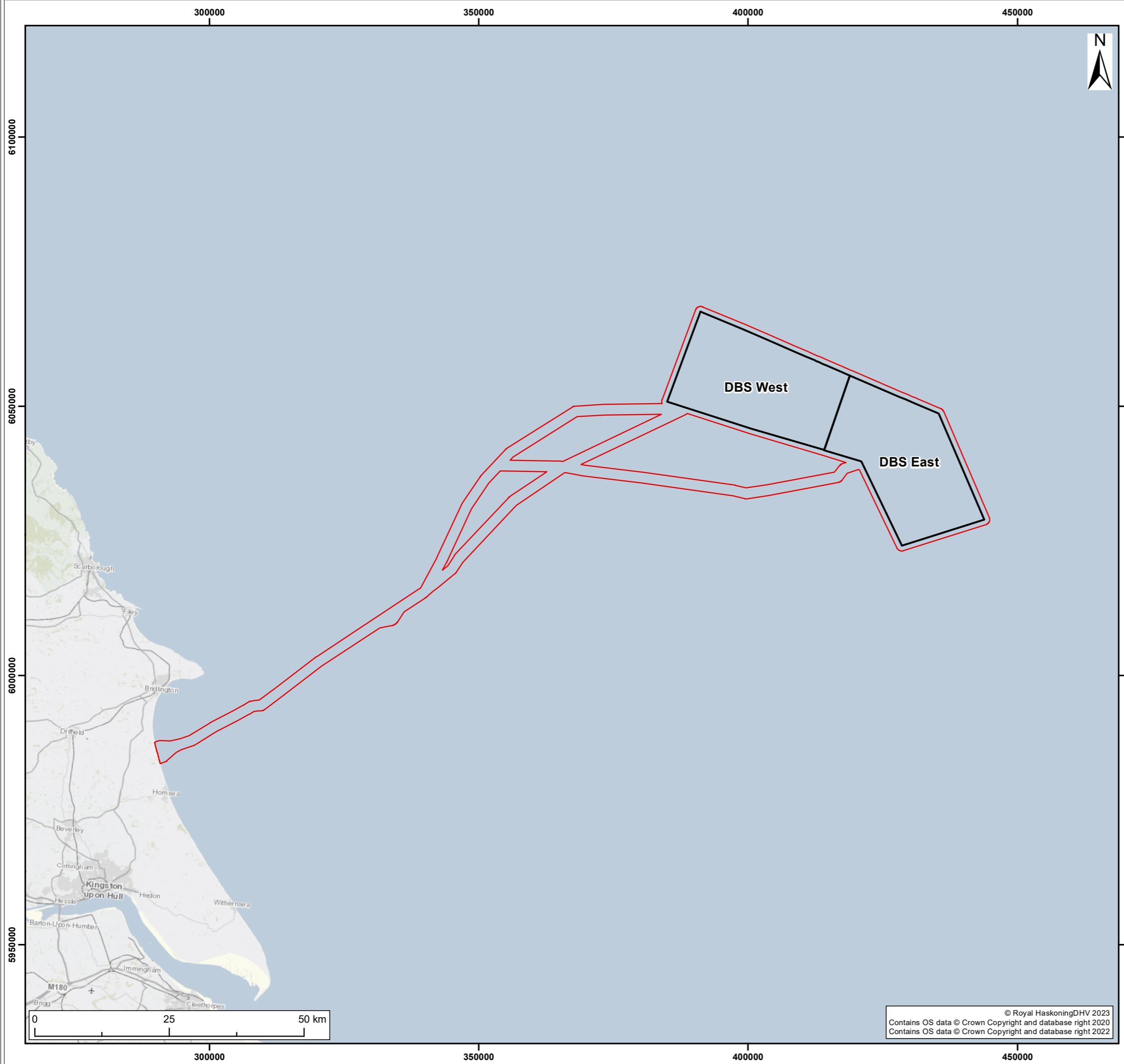
30. The Applicants have undertaken community and stakeholder consultation, which has informed a number of key decisions in relation to the design and development of the Projects in order to deliver environmentally sustainable projects.
31. A description of all consultation and how it has been considered, including technical, community, landowner, other stakeholders and statutory consultation under the Planning Act, will be provided in the Consultation Report which will form part of the DCO application planned for submission in 2024.
32. Consultation will continue throughout the development of the Projects through Expert Topic Groups, stakeholder meetings, and landowner meetings. An Expert Topic Group is formed of specialists from statutory and non-statutory bodies who meet to discuss key technical issues regarding the Projects and the environmental impact assessment. Consultation on the PEIR forms part of the overall consultation process and stakeholders will continue to be consulted post-PEIR, where appropriate.
33. A non-statutory Introductory Consultation took place from 9 September to 14 October 2022. This included public consultation events and online material. Full details of the results of the non-statutory consultation can be found in the Introductory Consultation Report which will be available on the project website.
34. In order to allow for finalisation of the submission, a cut-off date of 17 February 2023 has been used for consultation information that has been incorporated in the PEIR. Consultation after this date will be considered to inform the ongoing development of the ES and DCO application.

35. The statutory public consultation on the PEIR will run for a period of six weeks and includes the following, as set out in the Statement of Community Consultation which can be found at www.doggerbanksouth.co.uk:
 - Public consultation events where members of the team will be available to answer questions and talk through proposals;
 - Consultation webinars for those that cannot attend a consultation event in person;
 - A dedicated project website (<https://doggerbanksouth.co.uk/>) where all information on the Projects is published, along with details of how to provide feedback on proposals;
 - Email and Freepost addresses to contact the project team and provide feedback;
 - A consultation brochure explaining the Projects, their various components and where to find more information;
 - Consultation questionnaire with qualitative and quantitative questions to capture consultation feedback. The questionnaire is available online, in printed format and available for download to be returned either by post, at events or via email;
 - A newsletter with details of the consultation, where to find out more information and how to respond has been sent out to everyone signed up to receive information on the Projects. It is also available at community access points, has been distributed to stakeholders and is available on the Project's website. Paper copies are also available upon request;
 - Community access points including local libraries and council offices will have paper copies of the consultation brochure, non-technical summary and newsletter available for the public to view and take away as required;
 - Face to face and/or virtual briefings will be offered to stakeholders including (but not limited to) parish and town councils, elected officials, representative bodies and statutory consultees; and
 - Meetings will be arranged on request for persons with an interest in land (for example landowners).
36. Details of the Projects technical consultation process is presented in **PEIR Chapter 7 Consultation**.

2. DBS Project Description

37. The Projects comprise offshore wind turbines, offshore electrical infrastructure/ accommodation, offshore cables, onshore cables, and onshore substations. The location of the Projects areas are shown in **Figure 2-1** and onshore areas in **Figure 2-2**. The Projects are located in the Dogger Bank region of the southern North Sea. The closest point to the coast from the wind farm sites is 100km from DBS West and 122km from DBS East. When operational, DBS East and DBS West combined would have the potential to generate renewable power for up to 3.4 million United Kingdom (UK) homes from up to 200 wind turbines combined between the Projects.
38. The offshore area includes the DBS East and DBS West array areas where the wind turbines would be located, and the offshore export cable corridors that connect the array areas to the landfall.

The Projects will also require onshore infrastructure in order to transmit and connect the offshore wind farms to the national grid (**Plate 2-1**). The earliest that construction could commence is 2026, with the onshore construction works likely to commence first. Further details of the key offshore and onshore components can be found in **Chapter 5 Project Description**.



Legend:

- Offshore Development Area
- Array Areas

S2	P01	20/04/2023	Suitable for Information	SB	JF	HC
SUI	REV	DATE	DESCRIPTION	DRW	CHK	APR

Title:
 Location of the offshore project area

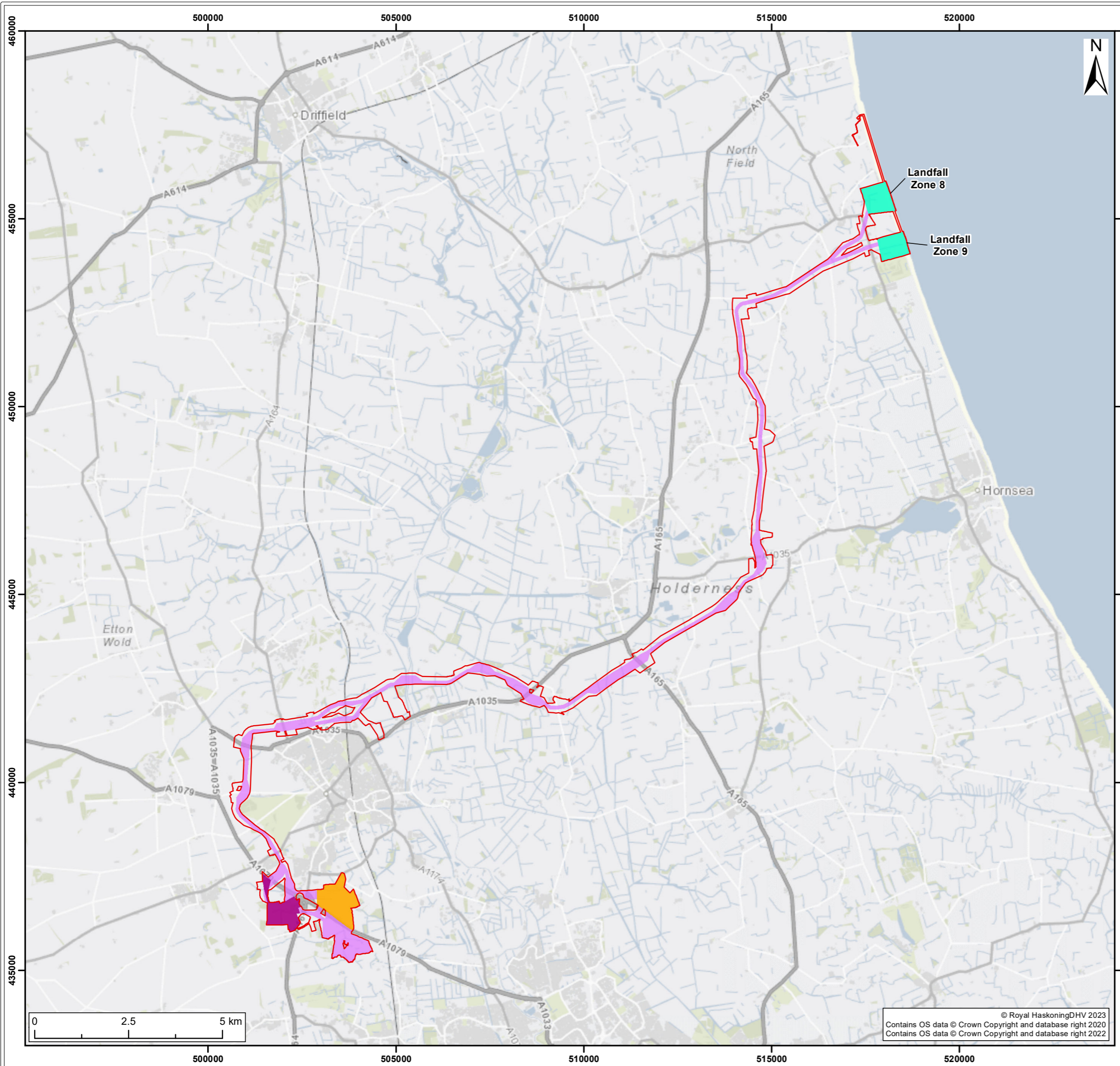
Figure: 1-1 Drawing No: PC2340-RHD-OF-ZZ-DR-Z-0503

Co-ordinate system: WGS 1984 UTM Zone 31N Page Size: A3 Scale: 1:700,000

Project: Dogger Bank South Offshore Wind Farms Report: Preliminary Environmental Information Report



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- Legend:
- Onshore Development Area
 - Preferred 100m Corridor
 - Landfall Zones
 - Substation Zone 1
 - Substation Zone 4

S2	P01	20/04/2023	Suitable for Information	SB	JF	HC
SUI	REV	DATE	DESCRIPTION	DRW	CHK	APR

Title:
 Location of the onshore project area

Figure: 1-2 Drawing No: PC2340-RHD-ON-ZZ-DR-Z-0502

Co-ordinate system: British National Grid	Page Size: A3	Scale: 1:100,000
----------------------------------------------	------------------	---------------------

Project: Dogger Bank South Offshore Wind Farms	Report: Preliminary Environmental Information Report
------------------------------------------------------	------------------------------------------------------------



2.1. Project Development Scenarios

39. As set out in section 1.1, whilst the Projects are each Nationally Significant Infrastructure Projects in their own right, a single application for development consent will be made to cover both wind farms, and the associated electrical transmission infrastructure (i.e. export cables and substations). A single planning process and DCO application is intended to provide for consistency in the approach to the assessment, consultation and examination. While a single DCO application will be made for both Projects, separate Deemed Marine Licences will be requested as schedules to the DCO to cover the wind farm sites and associated transmission infrastructure for each of the Projects. This approach allows each Project to retain rights to their own particular assets should ownership of each Project change over time.
40. Whilst the Projects will be the subject of a single DCO application (with a combined EIA process and associated submissions), each Project is assessed individually, so that mitigation is Project specific (where appropriate). As such, the assessments cover the possibility that:
- Only one of the Projects is developed, which could be either DBS East or DBS West; or
 - Both DBS East and DBS West are developed, either at the same time, or one after the other.
41. There are currently two possible electrical solutions being considered for DBS West, High Voltage Alternating Current (HVAC) or High Voltage Direct Current (HVDC). Due to the distance of the array area offshore, DBS East would be an HVDC project. Therefore, there are two possible electrical solutions for the Projects:
- One HVDC project and one HVAC project; or
 - Two HVDC projects.
42. Offshore, the most significant difference between an HVAC solution and an HVDC solution is that if an HVAC electrical solution is used, an additional platform would be required along the offshore export cable. This is required to act as a booster station for the HVAC transmission due to the distance offshore. In addition, an HVAC solution would require two additional offshore export cables, over and above the four offshore export cables that would be required for two HVDC projects.

2.2. Construction Scenarios

43. There are a number of scenarios for how the two Projects may be constructed (relating to both onshore and offshore works) which are set out below:
- DBS East and DBS West may be constructed at the same time, or at different times;
 - If built at the same time, both Projects could be constructed in five years;
 - If built separately, either Project could be built first;
 - If built separately, each Project would require a five year period of construction;
 - If built separately, there could be up to a two year gap between the start of construction for the first project and the start of construction for the second project; and
 - Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.
44. The construction scenarios set out above all allow for flexibility to build out the Projects using a phased approach i.e. either Project could be partially completed and brought into operation before the remainder of that Project is built. This will allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the onshore grid connection points. These scenarios have been assessed within the PEIR.

2.3. Key Components of the Offshore Wind Farms

45. The Projects will comprise the following main offshore components:
- Wind turbines;
 - Offshore platforms;
 - Foundation structures for wind turbines and offshore platforms;
 - Array cables which link the wind turbines to the offshore platforms;
 - Inter-platform cables which link the platforms; and
 - Export cables from the wind farm sites to the landfall.
46. The main onshore components of the Projects will include:
- Landfall and associated transition joint bays which are used to connect the onshore and offshore cables at the landfall;
 - Onshore export cables installed underground from the transition joint bays at the landfall to the Projects' onshore substations;
 - Onshore Project substations and onward cable connection to the newly constructed National Grid substation to the south of Beverley near to Creyke Beck;
 - Construction and operational accesses; and
 - Temporary Construction compounds.
47. Further details of the offshore and onshore works can be found below and in **Chapter 5 Project Description**.

2.4. Offshore Works

48. Up to 100 wind turbines would be installed at DBS East and up to 100 wind turbines at DBS West. A range of different turbine sizes and associated foundations are under consideration, but the maximum tip height would be 450m above mean water high springs (MWHS). If larger capacity wind turbines are used, fewer turbines would be required in total. A temporary construction buffer of 1km would be applied around the array areas.
49. Inter-array cables within the array areas would link the wind turbines to the offshore substation platforms. Depending on the development scenario (see section **Plate 2-1**), up to eight offshore substations could be required, and the two Projects could be connected to one another via inter-platform cables. Up to three other offshore platforms may be required, located either along the export cable corridor or within the array areas. An offshore export cable corridor will link the array areas with the landfall at Skipsea. A temporary construction buffer of 500m will be applied either side of the offshore export cable corridor.

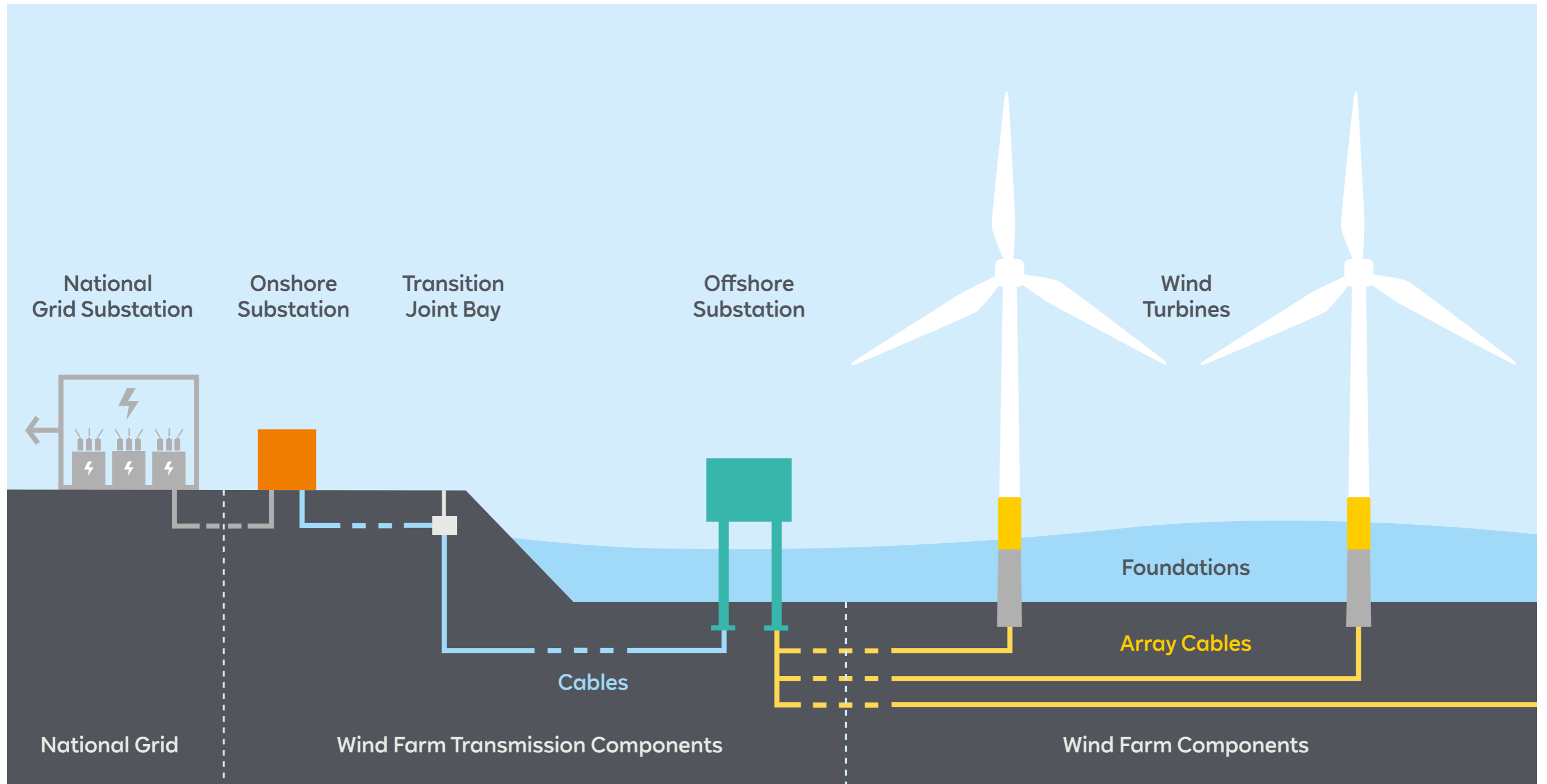


Plate 2-1 DBS East and DBS West Overview Schematic (N.B. Not to Scale)

2.5. Onshore Works

50. **Figure 1-2** shows the Onshore Development Area, which includes the landfall locations, the onshore export cable corridor, the possible substation zones and the connection onto the new National Grid substation.
51. The offshore export cables make landfall at Skipsea, with two possible locations identified for assessment in the PEIR. The offshore export cables will be connected to the onshore export cables in the transition joint bays, which will be located onshore. The cables will be installed under the cliffs using a trenchless technique such as horizontal directional drilling (HDD). This installation method avoids the need for excavating trenches to bury the cables under the cliffs and uses a drilling rig to install the cables beneath these features instead. The HDDs could exit either on the beach or within the marine environment. The installation method for this will be agreed following further detailed studies which will be undertaken post-consent.
52. During the landfall works a temporary onshore compound will be required to accommodate the drilling rigs, ducting and welfare facilities.
53. Two new onshore substations will be required, one for each Project. These will be located to the south west of Beverley. They will house electrical equipment and stand up to 27m tall. The PEIR assess two potential zones within which these substations could be located. A final decision on their location will be agreed over the coming months following the conclusion of the PEIR consultation. Depending on the final design scenario the footprint of these substations could be up to 200,000m². The onshore export cables will be installed between the landfall and the Projects onshore substations. The main cable installation method will be open cut trenching. This method requires trenches to be excavated, cable ducts placed into the trenches, and soil backfilled to bury the ducts. Cables are pulled through the buried ducts at joint locations. However, there are also a number of locations where trenchless techniques, such as HDD, will be undertaken, when crossing beneath some roads, rivers or other infrastructure. Temporary construction compounds will be required along the cable route, several options have been identified which will be refined to the preferred options over the coming months.

54. The onshore export cable corridor will be approximately 39km long and approximately 100m wide. In locations where trenchless crossings are required, the onshore cable corridor will be wider. The PEIR considers a 200m wide onshore cable corridor. An indicative 100m wide preferred onshore cable corridor has already been identified within the 200m onshore cable corridor. The onshore cable corridor will be refined taking into account PEIR consultation feedback, technical studies and ongoing environmental survey and assessment work.
55. Additional cables will also connect the Projects onshore substations to the new National Grid substation near the existing Creyke Beck substation to the south of Beverley. These cables will be installed in a similar way to the onshore export cables.
56. Following completion of the onshore construction works the land will be reinstated and can return to its previous uses, with the exception of the onshore substations, link boxes and transition joint bays which will remain in place throughout the 30-year operational life of the Projects.

3. Topics Covered in the Environmental Impact Assessment

57. The PEIR covers a wide range of offshore and onshore environmental topics for which potential impacts have been assessed. Many of these assessments are related to each other and these links are highlighted within the PEIR chapters.
58. The PEIR for the Projects presents preliminary assessments for all of the topics and potential impacts that were specified within the Planning Inspectorate's Scoping Opinion (Planning Inspectorate, 2022). Each of these assessments is summarised in the sections that follow.

3.1. Offshore

3.1.1. Marine Physical Environment

59. This chapter has provided a characterisation of the existing environment for the marine physical environment based on both existing and site-specific survey data.
60. The receptors that have been identified in relation to the marine physical environment are: the Dogger Bank and Southern North Sea SACs; the Flamborough Head SAC and SSSI; Dimlington Cliff SSSI; the Holderness Offshore MCZ and Holderness Inshore MCZ; the Flamborough and Filey Coast, Greater Wash and Humber Estuary SPAs; Smithic Sands; the Holderness Cliffs; the Flamborough Front; and inshore and offshore marine waters (separated to reflect designations within inshore waters such as bathing waters).
61. The effects of changes in suspended sediment concentration on these receptors during the construction phase have been considered. Due to the short duration of any disturbance and the relatively coarse nature of seabed sediments, any disturbed sediment is expected to settle back to the seabed in close proximity to the area of disturbance, allowing a return to baseline conditions within days of the activity.

62. Changes in suspended sediment have the potential to impact water quality if contaminated sediments are disturbed. However, the sensitivity of the receptors to changes in water quality is low and sediment contamination levels are also predicted to be low.
63. There is potential for changes in seabed level due to deposition of the disturbed sediment plume. However, a conceptual evidence-based assessment supported by modelling shows any changes in seabed level are at the millimetre (mm) scale. Therefore, changes would be indistinguishable against the expected sedimentary processes.
64. HDD methods below the Holderness Cliffs will be used to install the export cables at the landfall. However, there is potential for the HDD exit point to be located within the intertidal zone which may require temporary installation of cofferdams (dam-like structures) during construction, which may impact sediment movement in the intertidal and nearshore zone. Receptors sensitive to such changes in sediment movement, including Smithic Bank, may be present within the offshore export cable corridor. Any associated impacts are assessed as localised and temporary in nature.
65. Changes to wave and tide regimes during the operation phase have been assessed using modelling. The results show the blockage effect caused by the presence of structures on the seabed and within the water column are small in magnitude and localised. Changes to the tide and wave regime may influence sediment movement resulting in a reduction or increase in sediment movement which would manifest as a change in seabed structure. The effect will be confined to the area immediately adjacent to seabed structures.
66. The presence of cable protection measures on the seabed will potentially interrupt sediment transport which will have a greater effect in the nearshore and intertidal zone where receptors are sensitive to changes in sediment movements. In time, sediments are expected to create a ramp over the cable protection measures allowing sediment to move past.
67. The significance of effect on the identified receptors during construction, operation, and decommissioning phases of the Projects (in isolation and if both Projects are built together) are all considered to be either **negligible** or have **no effect**, and no additional mitigation measures are deemed necessary.
68. Further information can be found in **Chapter 8 Marine Physical Environment**.

3.1.2. Benthic Habitats

69. Ecological surveys of the seabed were undertaken across the wind farm sites and cable corridor to provide a detailed understanding of the benthic ecology of the seabed within the area. In addition, data available from neighbouring wind farms in the wider Dogger Bank were used. The data considered were used to identify the seabed composition and habitats present within the wind farm sites and offshore export cable corridor.
70. The seabed was predominantly characterised by sand, with gravel comprising the highest proportion of sediment up to 24km from the proposed landfall locations. Minor instances of higher contaminant levels were detected primarily around one sample station, approximately 24km offshore. Benthic communities and habitats were typical of those found in the identified sediments for the Southern North Sea.
71. Potential impacts include temporary disturbance and/or loss of habitats, increases in suspended sediments and sediment deposition, underwater noise, and the potential introduction of invasive non-native species. Effects are generally localised in nature, being restricted to the project boundaries and immediate surrounding area, and temporary in nature.
72. The assessment has established that there will be some **minor adverse** effects during the construction, operation and decommissioning phases of the Projects, both in isolation and together, which are not significant in EIA terms.
73. Further information can be found in **Chapter 9 Benthic Habitats**.

3.1.3. Fish and Shellfish Ecology

74. The Fish and Shellfish Ecology Study Area is defined by the International Council for the Exploration of the Sea (ICES) rectangles that overlap with the wind farm sites and export cable corridor. Information from these ICES rectangles has been supplemented by site-specific surveys, existing data from similar projects, and peer-reviewed literature. This allows consideration of effects that may occur directly within DBS East and DBS West, as well as those that have the potential to occur within the wider region, such as on spawning or nursery grounds, or migratory pathways.
75. The assessment classifies fish and shellfish receptors within five groups: elasmobranchs (sharks, skates, and rays), demersal (bottom dwelling) fish, pelagic (open water) fish, migratory fish, and shellfish. Spawning or nursery areas were identified within the Study Area for spurdog, tope shark, anglerfish, Atlantic cod, blue whiting, Dover sole, European hake, ling, plaice, sandeel species, whiting, mackerel, and herring.
76. Potential minor adverse effects on fish and shellfish species were identified for activities during construction, operation, and decommissioning phases. These include temporary and permanent losses of spawning and/or nursery grounds, increases in local suspended sediment concentrations and deposition, release of sequestered contaminants, effects of reduced fishing pressure, EMF effects from cables, and impacts as a result of underwater noise and vibration. Underwater noise and vibration impacts have the potential to occur both through clearance (e.g., detonation, deflagration) of unexploded ordnance and through construction or maintenance activities such as piling.
77. Effects are generally localised in nature, being restricted to the Fish and Shellfish Ecology Study Area, and in many cases to just the area immediately surrounding project infrastructure. No additional mitigation measures are deemed necessary.
78. The assessment concludes that there may be, at most, **minor adverse** effects on fish and shellfish receptors within the Study Area across all phases of the Projects, both in isolation and together, and effects not significant in EIA terms.
79. Further information can be found in **Chapter 10 Fish and Shellfish Ecology**.

3.1.4. Marine Mammals

80. Site characterisation using project specific surveys, existing data from other offshore wind farms and other available information for the region identified harbour porpoise, bottlenose dolphin, common dolphin, white-beaked dolphin, minke whale, grey seal, and harbour seal as the key marine mammal species for assessment.
81. The impacts that have been assessed include the potential for underwater noise from the clearance of unexploded ordnance, piling (including use of acoustic deterrent devices), other construction activities, operation and maintenance works and vessels resulting in damage to hearing, disturbance, behavioural impacts, barrier effects (i.e. preventing movement of animals) and changes to food availability. Other potential impacts that were assessed include increased collision risk with vessels, changes to prey resource, and changes in water quality.
82. The underwater noise modelling and results of the wider impact assessment concluded that there would be a **major adverse** effect on harbour porpoise and minke whale, and **moderate adverse** effect on grey seal regarding potential damage to hearing. The conclusion of **moderate adverse** effect on grey seal was also reached for the impacts of disturbance from underwater noise during piling simultaneously at three locations and disturbance based on a dose-response curve for monopiles (or jacket pin piles) at both locations concurrently.
83. The conclusion of **moderate adverse** effect was also reached for harbour porpoise, bottlenose dolphin, common dolphin, grey seal and harbour seal regarding increased collision risk during construction. Increased collision risk during construction was found to have a **moderate adverse** effect on harbour and grey seal only. The remaining impacts were found to have, at most, a minor adverse effect on all marine mammal receptors.
84. Mitigation measures have been identified to reduce the effect significance, these include a marine mammal mitigation protocol (MMMP) for reducing significant underwater noise effects of piling activities, and a site integrity plan (SIP) for the Southern North Sea SAC to set out measures to reduce significant disturbance of harbour porpoise in the area. In addition, a pollution environmental management plan (PEMP) would be produced to set out best practice measures to minimise the risk of any accidental spills/leaks.
85. The assessment has concluded that the residual effect significance, after the above identified mitigation, will be **minor adverse** and not significant in EIA terms.
86. Further information can be found in **Chapter 11 Marine Mammals**.

3.1.5. Offshore Ornithology

87. Site characterisation of the existing environment for Offshore Ornithology is based on both existing data and 12 months of site specific survey data. Based on this, a number of species were identified as key receptors for assessment of significant effects; fulmar, gannet, arctic skua, great skua, kittiwake, little gull, common gull, lesser black-backed gull, herring gull, great black backed gull, puffin, razorbill and common guillemot. An additional 12 months of site specific survey data have been obtained, with the analysis to be considered within the ES.
88. Potential impacts during construction and decommissioning that have been assessed are; direct disturbance and displacement from increased vessel activity, and indirect impacts through effects on habitats and prey species.
89. Potential impacts during operation include disturbance and displacement from offshore infrastructure, indirect impacts through effects on habitats and prey species, collision risk and combined operational collision risk and displacement for gannet.
90. The PEIR assessment concluded that construction, decommissioning and operational residual effects were **negligible** or **minor adverse** for all species considered based on 12 months of survey data, which is not significant in EIA terms and no additional mitigation measures are proposed.
91. As only the first 12 months of survey data were available to inform the PEIR assessment, it's possible that the conclusions of the assessments may change when the second year of data has been included as part of analysis in the ES. As such, the conclusions provided in the PEIR should be treated as preliminary at this stage as the second year of data is expected to alter the figures on which the assessment is based.
92. Further information can be found in **Chapter 12 Offshore Ornithology**.

3.1.6. Commercial Fisheries

93. Characterisation of the existing environment for Commercial Fisheries is based on existing and site specific survey data, in addition to feedback from local, national and international fisheries stakeholders.
94. Key receptor groups identified within the commercial fisheries assessment are as follows: demersal seines and trawls, dredge, intertidal netters, otter trawls, pelagic trawls, inshore static gear, and offshore static gear. Potential impacts to these receptors include loss or restricted access to fishing grounds, which was assessed as having a **moderate adverse** effect during construction and decommissioning for inshore static gear, and **negligible / minor adverse** for all other types of fishing gear.
95. Other potential impacts include displacement leading to gear conflict and increased pressure on adjacent fishing grounds, loss or damage of fishing gear due to snagging, temporary increased steaming times, impacts on commercially important fish and shellfish species, and navigational safety. All effects were assessed as either **negligible** or **minor adverse** and not significant in EIA terms.
96. Additional mitigation measures have been identified to reduce the significance of the effect of loss or restricted access to fishing grounds, including options to encourage coexistence of fisheries with the Projects. These commitments will be outlined in an Outline Fisheries Liaison and Coexistence Plan submitted as part of the DCO submission. The residual effect after mitigation is assessed as **minor adverse**. No other mitigation measures are proposed.
97. Further information can be found in **Chapter 13 Commercial Fisheries**.

3.1.7. Shipping and Navigation

98. Characterisation of the existing environment for shipping and navigation is based on both existing and site specific survey data.
99. The potential impacts to shipping and navigation include vessel displacement and increased vessel to vessel collision risk between third-party vessels, increased vessel to vessel collision risk between a third party vessel and a project vessel, creation of vessel to structure collision risk (i.e. vessels colliding with a wind farm structure), reduction of under-keel clearance due to cable protection, anchor interaction with sub-sea cables, and reduction of emergency response capability.
100. Vessel displacement and increased vessel to vessel collision risk between third-party vessels was assessed as **tolerable** and requires additional mitigation that includes consultation with companies that regularly operate vessels in the area. The residual effect after mitigation is assessed as **broadly acceptable**. All other impacts were assessed as **tolerable** or **broadly acceptable** and not significant in EIA terms, therefore no further mitigation is proposed.
101. Site specific surveys in relation to the potential platforms within the offshore export cable corridor are still ongoing. Therefore, no associated assessment of significance has been undertaken at the PEIR stage. Potential platforms within the offshore export cable corridor will be accounted for separately from the Projects array areas and offshore export cable corridor, as appropriate, in the assessment of significance at the ES stage. This assessment will be supported by site specific surveys being undertaken between PEIR and ES to examine potential locations for offshore platforms within the offshore export cable corridor.
102. A Hazard Workshop will also take place with relevant stakeholders in which the impacts associated with the Projects array areas and offshore export cable corridor (including potential platforms) will be undertaken. Any feedback received will be considered when updating the assessment of significance.
103. Further information can be found in **Chapter 14 Shipping and Navigation**.

3.1.8. Aviation and Radars

104. Characterisation of the existing environment for Aviation and Radar is based on existing publicly available data. The desk-based assessment has considered effects with respect to impacts on radar and UK airspace predicted due to the physical presence of the Projects and associated air traffic during the construction, operation, and decommissioning phases.
105. Potential impacts are physical obstruction to aircraft, increased air traffic in the area related to wind farm activities, and interference on radars caused by rotating wind turbine blades.
106. Potentially affected aviation stakeholders include military radar facilities, and offshore fixed-wing and helicopter flights such as military low flying, search and rescue operations, and helicopter support for the oil and gas industry.
107. Physical obstruction to aircraft has been assessed as a **moderate significant** effect, and interference on radars assessed as a **major significant** effect. These impacts require additional mitigation that includes consultation with aviation stakeholders to safeguard offshore oil and gas operations, and technical mitigation solutions for radar interference to be sought and discussed with the Ministry of Defence (MOD). The residual effect after mitigation is assessed as **not significant**.
108. No other significant effects in EIA terms on Aviation and Radar have been identified. Therefore, no further mitigation is proposed.
109. Further information can be found in **Chapter 15 Aviation and Radar**.

3.1.9. Infrastructure and Other Users

110. Characterisation of the existing environment for infrastructure and other users is based on existing public data, which indicated the potential for interactions between the Projects and other nearby offshore wind farms, oil and gas infrastructure, subsea cables and pipelines, disposal and aggregate extraction sites and MOD activities.
111. The potential impacts identified were interference with other wind farms, interference with oil and gas operations, physical impacts on subsea cables and pipelines, impacts on disposal sites and extraction sites, and impacts on MOD activities. All effects have been assessed as **minor adverse** or **negligible** and not significant in EIA terms, and no further mitigation is proposed.
112. Further information can be found in **Chapter 16 Infrastructure and Other Users**.

3.1.10. Offshore Archaeology and Cultural Heritage

113. Characterisation of the existing environment for Offshore Archaeology and Cultural Heritage is based on existing data. Site specific geophysical data have been acquired and are currently being assessed. The assessment results will be included in the ES.
114. The effects considered in the assessment for construction, operation and decommissioning include direct impact to known heritage assets, direct impact to potential heritage assets, indirect impact to heritage assets from changes to physical processes and impacts to the setting of heritage assets
115. Direct impacts to known, and potential, heritage assets were assessed as having a **major adverse** effect and requires additional mitigation. This includes further assessment of geotechnical data, a protocol for archaeological discoveries, and avoiding archaeological exclusion zones (AEZ). The residual effect after mitigation is assessed as either **no change** or **minor adverse**.
116. For all other impacts an effect of **no change** or **minor adverse** was concluded, and not significant in EIA terms.
117. The approach to the implementation of these mitigation measures will be set out in an Outline Offshore Written Scheme of Investigation which will be submitted alongside the ES and DCO application.
118. Further information can be found in **Chapter 17 Offshore Archaeology and Cultural Heritage**.

3.2. Onshore

3.2.1. Terrestrial Ecology and Ornithology

119. This chapter provides a characterisation of the existing environment for terrestrial ecology based on both existing and site specific survey data.
120. The identified receptors for potential impacts includes statutory and non-statutory designated sites, priority habitats, amphibians, badgers, bats, breeding and over-wintering birds, freshwater fish, invertebrates, otters, reptiles, water voles, and adjacent habitats/species during operation of the Projects.
121. The impacts assessed are construction disturbance to statutory and non-statutory designated nature conservation sites, permanent and temporary habitat loss / fragmentation, and death, injury, or disturbance to protected species or destruction damage or disturbance to protected species habitat.
122. All effects were assessed as **moderate adverse** to **major adverse** and require additional mitigation. Mitigation will be secured through an Outline Landscape and Environment Management Plan. The residual effect significance after mitigation is assessed as **negligible** and **moderate adverse** and will be reviewed at the ES stage.
123. Further information can be found in **Chapter 18 Terrestrial Ecology and Ornithology**.

3.2.2. Geology and Land Quality

124. Characterisation of the existing environment for Geology and Land Quality is based on existing data, for example British Geological Survey (BGS) datasets, Google Earth, and Multi Agency Government Information for the Countryside (MAGIC) map applications.
125. The assessment has established that the receptors relating to Geology and Land Quality could be impacted as a result of exposure of the workforce, landowners and land users to contamination, direct impacts on groundwater quality/resources, surface water quality and ecological habitats, sterilisation of future mineral resources, and impacts to the built environment, designated sites, or agricultural land.
126. All effects were assessed as **minor to major adverse** and require additional mitigation. Additional mitigation includes (but is not limited to) targeted pre-construction ground investigations, implementation of a Code of Construction Practice adopting best practice measures, consultation with the East Riding of Yorkshire Council, reducing construction activities close to existing buildings and implementation of site and task specific risk assessments. The residual effect significance after these mitigation measures is assessed as **minor adverse** for all effects apart from the potential effect to Skipsea Drain Local Geological Site where there is potential for a **major adverse** effect.
127. Further information can be found in **Chapter 19 Geology and Land Quality**.

3.2.3. Flood Risk and Hydrology

128. Characterisation of the existing environment for Flood Risk and Hydrology is based on both existing data (e.g. national flood risk and Water Framework Directive classification datasets) and site-specific survey data (e.g. a geomorphological walkover survey).
129. The assessment has established that surface and groundwater receptors could be affected as a result of direct disturbance, the supply of fine sediment and contaminants, and changes to flow patterns during the construction and decommissioning phases. The assessment has also established that surface and groundwater receptors could be affected by the supply of contaminants and changes to flow patterns during the operational phase.
130. All effects have been assessed as **no effect** to potentially **moderate adverse** (depending on sensitivity) and require additional mitigation. Additional mitigation measures include best practices for trenched crossings, sediment control, use of and control of fuels, oils, and lubricants, construction drainage plans, and sustainable drainage systems. The residual effect significance is assessed as **negligible to minor adverse** for all impacts and not significant in EIA terms.
131. Further information can be found in **Chapter 20 Flood Risk and Hydrology**.

3.2.4. Land Use

132. Characterisation of the existing environment for Land Use is based on both existing and site specific survey data.
133. The identified receptors for potential effects include the field drainage network, agricultural land and soil, utilities, environmental stewardship schemes (ESS), and users of recreational routes (e.g. public rights of way). Potential impacts are identified as agricultural drainage, temporary or permanent loss of agricultural land, soil degradation and erosion, impacts to ESS, disruption to utilities, disruption to users of recreational routes, and soil heating.
134. The following effects were assessed as having a **moderate to major adverse** effect and require additional mitigation: agricultural drainage, temporary and permanent loss of agricultural land, soil degradation and erosion, and disruption to users of recreational routes.
135. Identified additional mitigation includes maintaining or reinstating land drainage systems, provision of a specialised drainage contractor and producing a soil management plan (SMP), landowner consultation and private agreements, maintaining access for farm vehicles, topsoil stripping, appropriate handling of soils, minimising the excavation footprint, appropriately fenced crossing points and alternative routes for recreational users. Following mitigation all effects are assessed as **minor adverse**, except for temporary loss of agricultural land which remains at **moderate adverse** as an area of land will still be impacted (>20ha). No other mitigation is proposed.
136. Further information can be found in **Chapter 21 Land Use**.

3.2.5. Onshore Archaeology and Cultural Heritage

137. This chapter has provided a characterisation of the existing environment for onshore archaeology and cultural heritage based on both existing and site specific survey data. The impact assessment as presented in this chapter assumes that activities associated with construction may theoretically occur anywhere within the Onshore Development Area.
138. Potential receptors identified include designated and non-designated heritage assets, buried archaeological remains, and geoarchaeological deposits. Impacts that may occur as a result of the Projects include direct or indirect physical impacts on heritage assets, and changes to the setting of heritage assets. Potential impacts on these receptors include direct and indirect physical impacts on heritage assets, and temporary or permanent changes to the setting of heritage assets.
139. The following effects have been assessed as **moderate to major adverse** and require additional mitigation: direct and indirect physical impacts to non-designated heritage assets, and temporary and permanent changes to the setting of heritage assets. An archaeological mitigation strategy will be developed for the ES which will be based on the results of further survey work to be undertaken in the coming months. Once this is available it is assumed that the residual effects can be reduced to **minor adverse** in the majority of cases, and not significant in EIA terms. This will be confirmed in the ES.
140. Heritage setting assessment work is ongoing, and final impact assessment and summaries / conclusions have not yet been conducted or drawn for individual heritage assets that are currently under consideration in the PEIR chapter. The settings assessment will be progressed and reported on in full in the final DCO application.
141. Further information can be found in **Chapter 22 Onshore Archaeology and Cultural Heritage**.

3.2.6. Landscape and Visual Impact Assessment

142. This chapter has provided a characterisation of the existing environment for the LVIA based on both existing data and site specific surveys, which has established that there will be some potential impacts on landscape and visual receptors.
143. Identified receptors for potential impacts as a result of the Projects are grouped into 'subareas' and substation zones along the cable route and landfall, and include: subarea 1 (landfall), subarea 2 (Skipsea to West Road), subarea 3 (West Road to the River Hull), subarea 4 (River Hull to Onshore Substation Zones), subarea 5 (onshore substation zones), substation Zone 1, and substation Zone 4. Potential impacts to these receptors include landscape effects and visual effects of the export cable corridor or onshore substations.
144. The following effects are assessed as **moderate** or **major adverse** and require additional mitigation: landscape effects of onshore substations (subarea 5 and substation zones 1 and 4), visual effects of landfall and the onshore export cable corridor (subarea 1) during construction, and visual effects of onshore substation zones. All other effects are assessed as **minor adverse** and not significant in EIA terms.
145. Identified additional mitigation includes construction being led by a Code of Construction Practice, retaining or replacing trees and hedgerows where possible, reinstating landfall and cable corridor areas to its previous condition where reasonably practicable. A Soil Management Plan will be produced and in accordance with the Construction Code of Practice for the Sustainable use of Soils on Construction Sites (Defra 2009).
146. At the ES stage, a landscape mitigation plan will be produced for each onshore substation, as part of the outline Landscape and Environmental Management Plan (LEMP). Post consent, a detailed landscape mitigation plan will be developed with the aim of integrating the substations into the existing landscape and, where appropriate, deliver biodiversity enhancements.
147. The assessment of residual effects will be assessed within the ES, following the preparation of a more developed mitigation scheme. However, it is expected that the residual effects would reduce following successful implementation of the mitigation scheme, once proposed planting and vegetation matures.
148. Further information can be found in **Chapter 23 Landscape and Visual Impact Assessment**.

3.2.7. Traffic and Transport

149. The Traffic and Transport chapter assesses the potential effects of the onshore infrastructure of the Projects on the surrounding traffic sensitive receptors. The assessment has been developed with regard to the legislative and policy framework of the PEIR and further informed by consultation with East Riding of Yorkshire Council, Hull City Council and National Highways, as well as traffic surveys.
150. Traffic demand has been forecast by applying a first principles approach to generate traffic volumes from an understanding of material quantities and personnel numbers that will be required for the Projects. This traffic demand has been assigned to access locations serving the Projects and applying a package of embedded mitigation to minimise the significance of effects.
151. In accordance with national guidance, a Traffic and Transport Study Area has been identified, baseline conditions established and sensitive receptors within the Traffic and Transport Study Area identified. This area was screened to identify routes that could be potentially adversely affected by the Projects' traffic generation.
152. A total of 66 highway links totalling 150km of highway network within the Traffic and Transport Study Area have been assessed for the impacts of amenity, severance, road safety and driver delay. With the application of additional mitigation measures (as appropriate) the residual effect upon all receptors was assessed to be not significant in EIA terms.
153. A number of links were assessed as having potential **moderate** to **major adverse** effects for amenity, road safety, driver delay, and highway geometry impacts. Additional mitigation measures identified include discussions with relevant highways authorities to agree acceptable levels of heavy goods vehicles (HGV), road safety interventions e.g. limiting peak daily traffic, restricting delivery times etc., extension of or new passing places, road/junction widening, and use of trenchless crossings. All other impacts were assessed as **negligible** or **minor adverse**.
154. This detailed assessment concluded that no residual moderate or major adverse effects would arise after mitigation, with all effects being of either **minor adverse** or **negligible** significance, and not significant in EIA terms.
155. Further information can be found in **Chapter 24 Traffic and Transport**.

3.2.8. Noise

156. This chapter has provided a characterisation of the existing environment for noise and vibration based on baseline noise survey data and baseline road traffic data.
157. A variety of receptors for potential noise impacts have been identified. Potential impacts include construction noise along the cable corridor, at the landfall location and onshore substations, construction noise from road traffic, and construction vibration. In addition, operational impacts may occur from the onshore substation.
158. Construction noise along the onshore cable corridor from both HDD and temporary construction compounds were assessed as **major adverse**, and construction road traffic noise on smaller roads as **moderate/major adverse** effects. These impacts require additional mitigation. All other effects were assessed as **negligible** or **minor adverse** and not significant in EIA terms.
159. Identified mitigation includes noise management measures detailed in the Outline Code of Construction Practice, with site specific best practicable means of noise control. An Outline Construction Traffic Management Plan will be prepared to manage peak traffic flows and minimise impacts. Drafts of both of these management plans will be available to view on the project website as part of this consultation. The residual effects of the above impacts are assessed as **minor adverse** or **moderate adverse**, with temporary effects predicted at receptors closest to trenchless crossings of the A164, should 24 hour working be required, and along Eske Road during construction.
160. Further information can be found in **Chapter 25 Noise**.

3.2.9. Air Quality

161. This chapter presents a characterisation of the existing air quality conditions and an assessment of the onshore air quality impacts and potential for significant effects due to the construction and decommissioning phases of the Projects. Onshore operation and maintenance and offshore air quality impacts have been agreed as not required. The assessment has been undertaken with reference to relevant legislation, policy and guidance and the assessment methodology agreed with East Riding of Yorkshire Council and Hull City Council.
162. The receptors identified for potential impacts from air quality include human receptors and ecological receptors. Potential impacts include construction dust, and emissions from road construction vehicles and non-road construction vehicles (transportable industrial equipment).
163. The effect of construction dust on human and ecological receptors is considered **not significant** with the implementation of site specific mitigation measures which are outlined in the Projects' Outline Code of Construction Practice.
164. The effect of non-road construction vehicle emissions, and road traffic emissions from the Projects is assessed as **not significant** with the implementation of best practice management measures.
165. Further information can be found in **Chapter 26 Air Quality**.

3.3. Wider Scheme Aspects

3.3.1. Human Health

166. This assessment considers potential impacts on population health from changes due to the Projects. The assessment considers the scenarios of only one of the Projects being built, or them both being built either at the same time, or one after each other.
167. Population health varies given factors such as personal choice, location, mobility and exposure. These factors that influence health are called determinants of health and they span environmental, social, behavioural, economic and institutional aspects. The Projects have the potential to change health factors, with beneficial and adverse effects, either directly, indirectly, or cumulatively. The two receptor groups identified for potential impacts include the general population and the vulnerable group population. Vulnerability relates to experiencing effects differently due to age, income level, health status, degree of social disadvantage or ability to access services or resources.
168. Potential impacts on these receptor groups includes disruption or disturbance to physical activity, transport types and access and health impacts associated with changes to air quality, water, soil contamination, noise disturbance, workforce upskilling, employment and investment, concern over EMF, climate change, and wider societal infrastructure.
169. For all impacts the effects are assessed as **negligible** or **minor adverse** (not significant in EIA terms) to **moderate beneficial** (significant in EIA terms). Additional mitigation measures include targeted noise barriers and insulation to reduce noise disturbance, and non-technical information sharing to reduce concern over EMF, reducing these effects from **minor adverse** to a **negligible** residual effect. No further mitigation is proposed.
170. Further information can be found in **Chapter 27 Human Health**.

3.3.2. Socio-Economics

171. This chapter has provided a characterisation of the existing environment for socio-economics based on publicly available data. It has considered evidence on demography, the economy, and the social infrastructure of Humberside, and compared it against UK-level performance.
172. The analysis was based on sectoral evidence and industry best practice. No data limitations with the potential to affect the findings from the assessment were identified. Receptors for potential effects were identified as the Humberside area and the wider UK.
173. Potential impacts include expenditure, employment, change in demographics, loss of or disruption to local infrastructure, disturbance (noise, air quality, visual and traffic) to social infrastructure, economic activity, and population.
174. Effect significance ranged between **negligible adverse** and **minor beneficial** and not significant in EIA terms. No further mitigation is proposed.
175. Further information can be found in **Chapter 28 Socio-Economics**.

3.3.3. Tourism and Recreation

176. This chapter has provided a characterisation of the existing environment for tourism and recreation using existing data.
177. The identified receptors for potential impacts include tourism businesses in the study area, tourism assets in the study area, and users of recreational routes. Potential effects include the tourism economy, tourism assets and recreational assets.
178. All effects were assessed as **negligible** and not significant in EIA terms. No mitigation measures are proposed.
179. Further information can be found in **Chapter 29 Tourism and Recreation**.

3.3.4. Climate Change

180. This chapter has provided a characterisation of the existing environment for climate change using existing data. The sole receptor is the global atmosphere and the central impact is identified as greenhouse gas (GHG) emissions during construction, operation and maintenance, and decommissioning.
181. Whilst the Projects will produce some GHG emissions, mainly during the construction phase, overall, it is assessed as having a **beneficial** effect on GHG emissions, with a saving of 198 million tonnes of CO₂ over the lifetime of the Projects. No mitigation measures are proposed.
182. Further information can be found in **Chapter 30 Climate Change**.

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RWE

**RWE Renewables UK Dogger
Bank South (West) Limited**

**RWE Renewables UK Dogger
Bank South (East) Limited**

Windmill Hill Business Park
Whitehill Way
Swindon
Wiltshire, SN5 6PB